2017 National Geospatial Data Asset (NGDA) Theme Summary Report
Imagery Theme

Overview:

This report aggregates information related to the National Geospatial Data Asset (NGDA) Theme in the title above. NGDA Themes serve as the management units for collections of related NGDA Datasets that benefit from coordinated development and management across the NGDA national geospatial portfolio. These NGDA Datasets are considered national capital assets and must meet the criteria outlined in OMB Circular A-16 *Supplemental Guidance*. The guidance directs the Federal Geographic Data Committee (FGDC) through cooperation with Federal agencies to implement and use a Portfolio management approach for managing NGDA Themes and their associated NGDA Datasets both within and across NGDA Themes. This ensures NGDA Themes are managed by officially designated agencies, on behalf of all users. In addition, each NGDA Theme has a Strategic Plan that establishes goals and objectives and an associated Implementation Plan that describes the activities the Theme will undertake to address them. Unless otherwise noted, this report covers the period from the baseline Lifecycle Maturity Assessment (LMA) in 2015 to August 2017.

NGDA Theme Details:

Theme: Imagery Theme

Theme Definition: Georeferenced images of the Earth's surface, which have been collected via aerial photography or satellite data. Orthoimagery is prepared through a geometric correction process known as orthorectification to remove image displacements due to relief and sensor characteristics, allowing their use as base maps for digital mapping and analyses in a GIS. Specific imagery data sets created through image interpretation and classification, such as a land cover image, can be found under themes specific to the subject matter. Includes imagery such as Landsat, NAIP, and DOQQs.

Theme Lead Agencies: U.S. Department of Agriculture, Farm Service Agency and U.S. Department of Interior, U.S. Geological Survey

Theme Executive Champions:

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Total Associated NGDA Datasets: 9

The following NGDA Datasets are associated with this NGDA Theme. This list includes an embedded hyperlink to the NGDA metadata found on Data.gov. Please note if the metadata has been updated and re-harvested after publication of this report, the link may no longer be valid. The NGDA Dataset may be searched for manually in Data.gov or GeoPlatform.gov by using the official NGDA Name (in Table 1 below) and including the keyword "NGDA" to narrow the results.

NGDA Name and Associated Data.gov Link	Agency Acronym
Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER)	NASA
Landsat 1-5 Multispectral Scanner: 1972-2013	DOI-USGS
LANDSAT 4-5 Thematic Mapper (1982 - present)	DOI-USGS
Landsat 7 Enhanced Thematic Mapper Plus Scan Line Corrector off: 2003-Present	DOI-USGS
Moderate Resolution Imaging Spectroradiometer (MODIS) - Aqua	NASA
Moderate Resolution Imaging Spectroradiometer (MODIS) - Terra	NASA
NOAA Coastal Mapping Remote Sensing Data	DOC-NOAA
The National Agriculture Imagery Program (NAIP) Imagery	USDA-FSA
USGS High Resolution Orthoimagery Collection	DOI-USGS

Table 1: Theme NGDA Datasets.

Lifecycle Maturity Assessment (LMA) Overview

Introduction

The Geospatial Data Lifecycle has seven stages that agencies should use when developing, managing and reporting on NGDA Datasets. These stages and their associated benchmarks[1] are defined in the A-16 *Supplemental Guidance* Stages of the Geospatial Data Lifecycle (see Figure 1). Reporting on the status of each NGDA Dataset is an OMB requirement, and assessing the developmental maturity of the NGDA provides managers the ability to support NGDA Datasets in a more universal and transparent manner. The FGDC NGDA lifecycle maturity assessment is based on responses made by Dataset Managers to questions associated with benchmarks in each lifecycle stage. Each stage has a range of benchmark activities, from no activity to significant activity, which provide the interpretation of maturity for each benchmark within a stage and cumulatively for each stage. The cumulative level of activity across each stage and for all stages determines the maturity of the each NGDA Dataset based on a Maturity Matrix (see Table 2) and the response metrics from How to Calculate Maturity. In this report, the LMA results for all the associated NGDA Datasets are aggregated through an average calculation at the Theme level. Additional information can be found at the GeoPlatform.gov 2017 Lifecycle Maturity Assessment (LMA) Community web page. Individual NGDA Dataset Reports can be found at FGDC.gov.
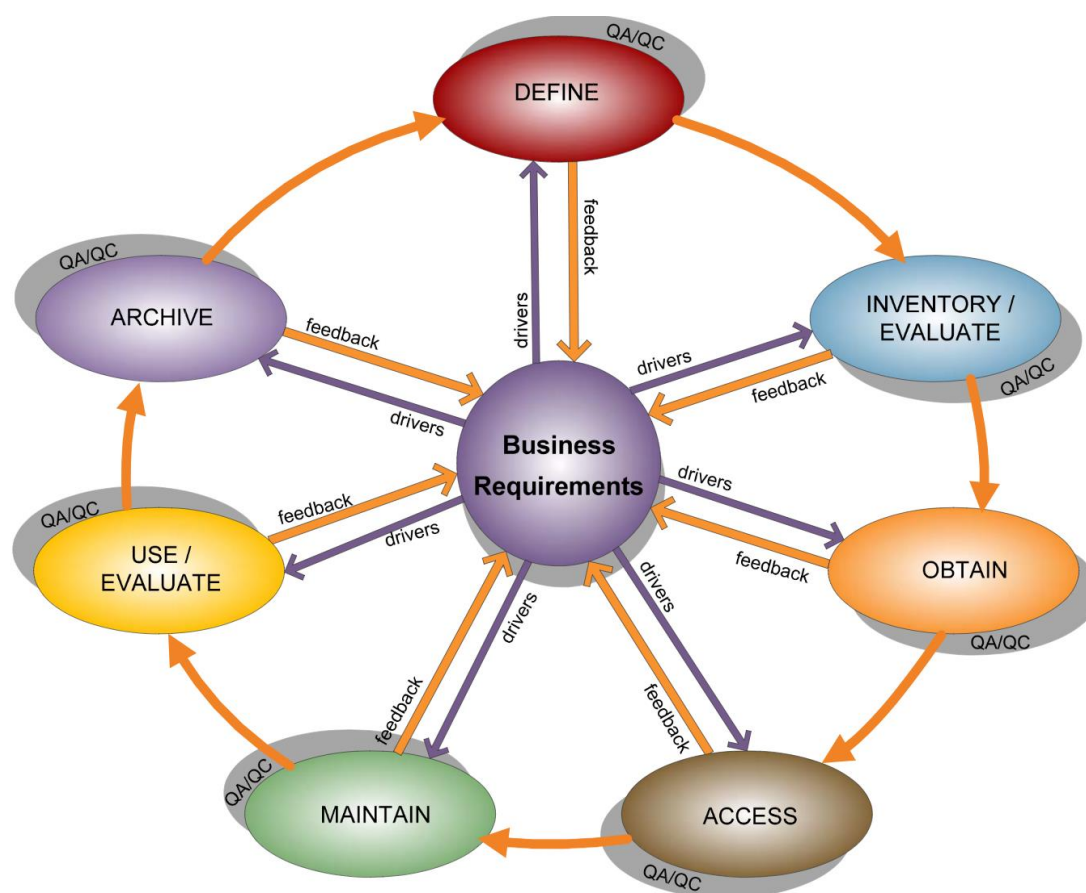

Figure 1. The Geospatial Data Lifecycle

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[1] Benchmarks are detailed in Table B1 of the Stages of the Geospatial Data Lifecycle document.

2017 Lifecycle Maturity Assessment Maturity Matrix

The Lifecycle Maturity Assessment Maturity Matrix provides descriptions of the maturity characteristics of benchmark activities for each stage within a dataset that result in a maturity level of 0-5, with no activity being level zero and optimized being level five, applied consistently across all lifecycle stages.

Maturity Level	Maturity Characteristics for All Lifecycle Stages
Optimized; Established Level = 5	Dataset meets virtually all business needs of all users. The dataset is considered authoritative by owners and secondary users. It is curated across all stages of the approved lifecycle. Future needs are defined for both the primary owner and secondary users on a regular basis and resources for addressing both current and future business requirements are available.
Mature; Consistent Level = 4	Dataset meets all the business needs of the primary owner and most of the secondary users. The dataset is curated and used as an authoritative resource by the primary owner and secondary users. Future needs are being identified and steps are planned to address these. All stages are supported and reviewed on a recurring basis. The dataset is well managed in relation to the approved lifecycle.
Managed; Predictable Level = 3	Dataset meets a significant number of the business needs of the primary owner and is widely used by secondary users. Benchmark activities are occurring in at least four of the approved lifecycle stages. Management practices in relation to the approved lifecycle is moderate but consistent. Dataset is integrating changing business requirements in lifecycle stages impacting overall maturity.
Transition; Transformation Level = 2	Dataset meets business needs of the primary owner and has moderate use by secondary users. Benchmark activities are occurring in at least three stages. Efforts to integrate funding, include partners, and obtain data are not supported in a sustained manner. Management practices in relation to the stages of the approved lifecycle is limited.
Planned; Initial Development Level = 1	Dataset in initial planning or limited in meeting business needs of the primary owner. Benchmark activities in the approved lifecycle are just starting to consider secondary uses, Partners/stakeholders involvement is being defined and developed to support additional dataset uses. Dataset development is in a very early stage. Minimal or limited management against the benchmarks in the approved lifecycle.
No Activity Level = 0	Dataset not developed or meets project/local business needs of the primary owner. Secondary, additional uses, or partners/stakeholders were not considered. Dataset is not recognized as authoritative data or is part of a similar dataset. Not managed to any of the benchmarks in the approved lifecycle.

Table 2: 2017 Maturity Matrix.

2017 LMA Maturity Results for the Theme

Based on the LMA results, maturity averages are calculated for all NGDA Datasets associated with the Theme to illustrate a roll-up of the general questions for all stages, and each lifecycle stage as shown in Table 3 below. This table provides a high-level view of the aggregated maturity of the NGDA Datasets in the Theme.

| Maturity Categories	Maturity Level
Roll-up NGDA Maturity	5 - Optimized; Established
General Questions for All Stages	5 - Optimized; Established
Stage 1: Plan/Define	5 - Optimized; Established
Stage 2: Inventory/Evaluate	5 - Optimized; Established
Stage 3: Obtain	5 - Optimized; Established
Stage 4: Access	5 - Optimized; Established
Stage 5: Maintain	5 - Optimized; Established
Stage 6: Use/Evaluate	5 - Optimized; Established
Stage 7: Archive	5 - Optimized; Established

Table 3: 2017 Maturity Results.

LMA Process Changes between 2015 and 2017

In 2015, a baseline assessment of NGDA was performed for each of the datasets in the federal geospatial portfolio. Information related to the 2015 baseline LMA can be found at 2015 NGDA Lifecycle Maturity Assessment, which also includes a link to the 2015 Reports. A follow-up analysis of the 2015 LMA baseline process and its results identified ways to improve the LMA workflow, increase efficiency as well as decrease the reporting burden. Several recommendations were identified and implemented in 2017, which included improvements to normalize the responses in 2017. A secondary effect of improvements to normalization is that results from 2017 and 2015 are not directly comparable. These changes, and their impacts, are detailed in the webpage: Temporal Changes in Lifecycle Maturity Assessment (LMA) Maturity and Results Comparisons.

Aggregated Maturity Level for Theme NGDA Datasets

The pie graph below shows the number of NGDA Datasets within each maturity level for this Theme.
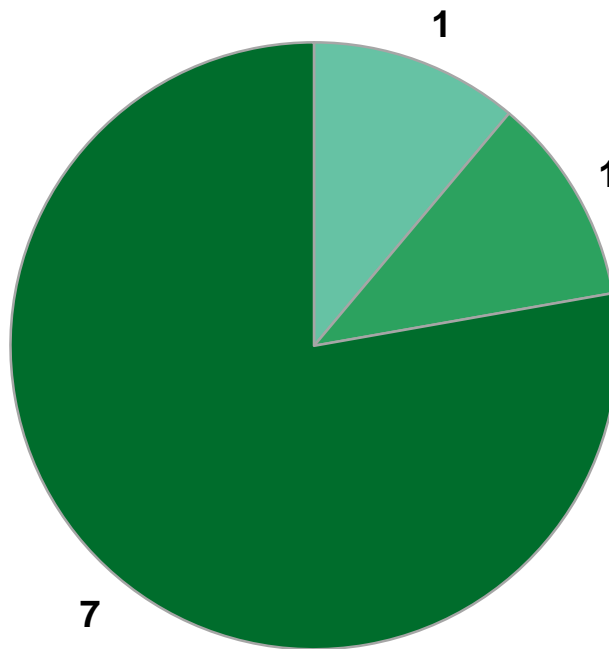
Graph 1: Aggregated NGDA Dataset Maturity Level Counts in the Theme.

**Key for NGDA Dataset Maturity Level:**

Optimized; Established Level = 5 5/5	Mature; Consistent Level = 4 4/5	Managed; Predictable Level = 3 3/5	Transition; Transformation Level = 2 2/5	Planned; Initial Development Level = 1 1/5	No Activity Level = 0 0/5

Stage-based Maturity Levels for Theme NGDA Datasets

The following graphs provide information about the NGDA Dataset maturity level counts for each lifecycle stage within the Theme. This information visualizes the NGDA Datasets according to the maturity matrix, which can show potential opportunities or challenges within a Theme.
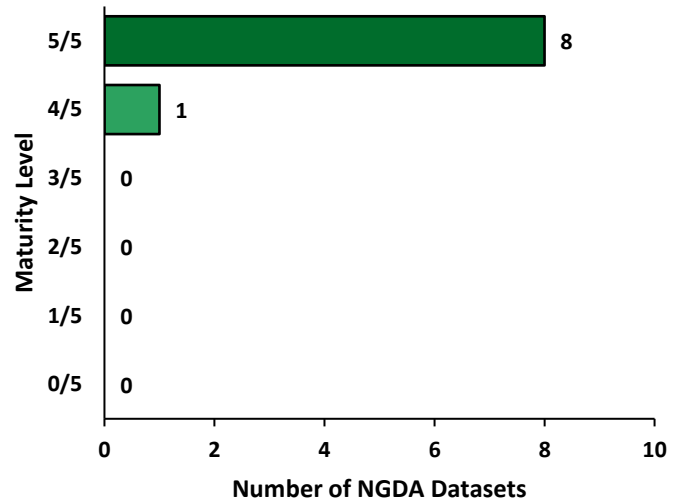
General Questions

Data characteristics that are applicable to all stages.
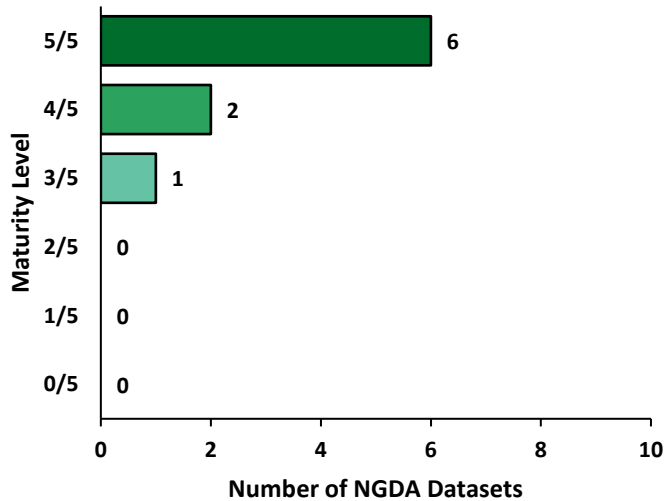
Graph 2: General Questions Stage NGDA Maturity Level Counts.
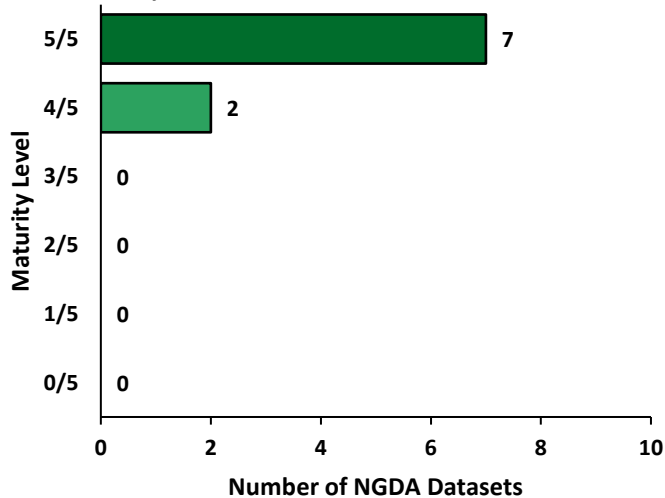
Stage 1 - Define/Plan

Characterization of data requirements based upon business-driven user needs.

Graph 3: Define/Plan Stage NGDA Maturity Level Counts.

Stage 2 - Inventory/Evaluate

The creation and publication of a detailed list of data assets and data gaps (both internal and external) as they relate to business-driven user needs.

Graph 4: Inventory/Evaluate Stage NGDA Maturity Level Counts.

Stage 3 - Obtain

The collection, purchase, conversion, transformation, sharing, exchanging, or creation of geospatial data that were selected to meet the business needs is identified.
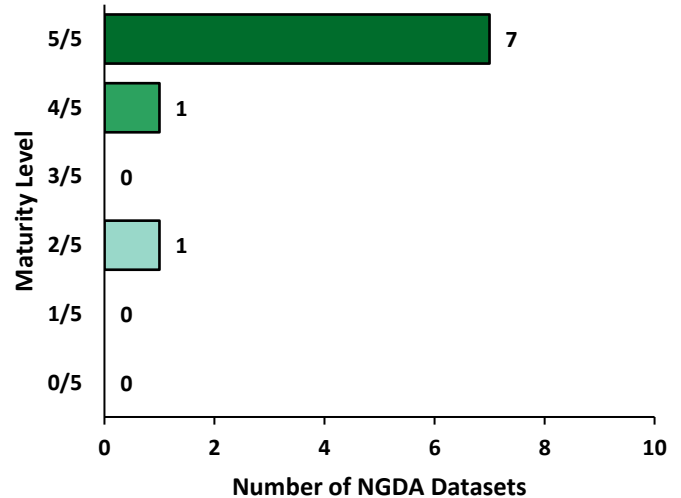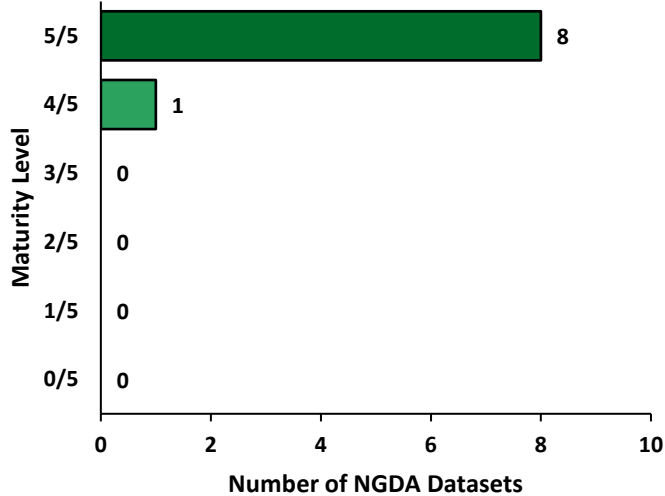

Graph 5: Obtain Stage NGDA Maturity Level Counts.

Key for NGDA Dataset Maturity Level:

| Optimized; Established Level = 5 5/5	Mature; Consistent Level = 4 4/5	Managed; Predictable Level = 3 3/5	Transition; Transformation Level = 2 2/5	Planned; Initial Development Level = 1 1/5	No Activity Level = 0 0/5

Stage 4 - Access

Making data known and retrievable through documentation and discovery mechanisms to meet user needs and business requirements.

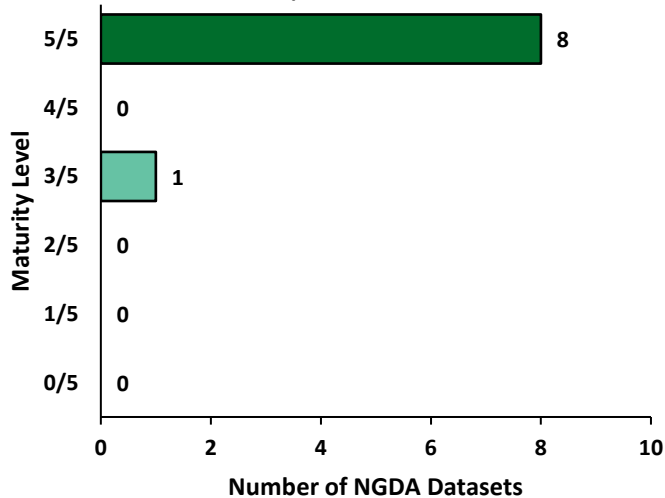Graph 6: Access Stage NGDA Maturity Level Counts.

Stage 5 - Maintain

The ongoing processes and procedures to ensure that the data meet business requirements.
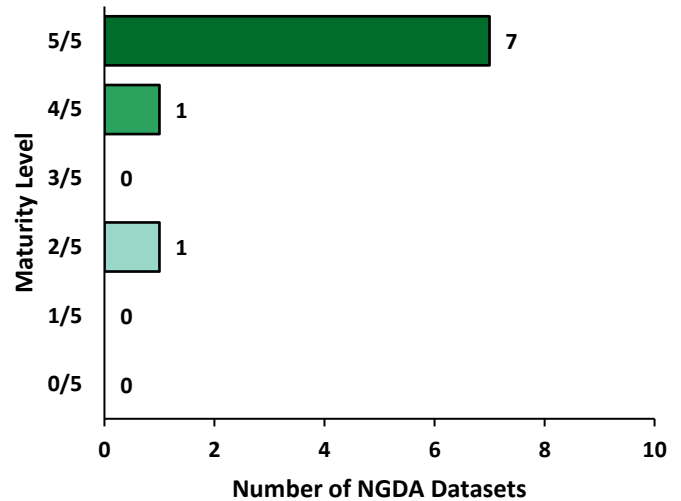
Graph 7: Maintain Stage NGDA Maturity Level Counts.

Stage 6 - Use/Evaluate

The ongoing assessment, validation, and potential enhancement of data to meet user needs and business requirements.

Graph 8: Use/Evaluate Stage NGDA Maturity Level Counts.

Stage 7 - Archive

Facilitate the appraisal, retention, storage, and accessibility of data and establish mechanisms for development of stewardship tools and services.
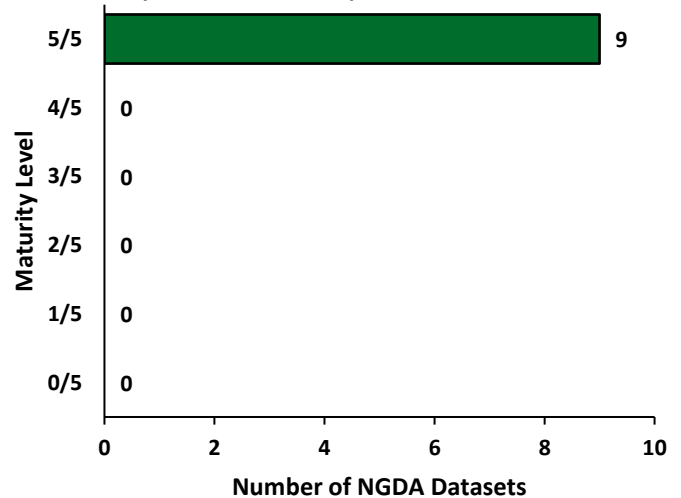
Graph 9: Archive Stage NGDA Maturity Level Counts.

Key for NGDA Dataset Maturity Level:

Optimized; Established Level = 5 5/5	Mature; Consistent Level = 4 4/5	Managed; Predictable Level = 3 3/5	Transition; Transformation Level = 2 2/5	Planned; Initial Development Level = 1 1/5	No Activity Level = 0 0/5

Theme NGDA Dataset Maturity Levels for Selected LMA Questions

In this section, several LMA questions have been identified that provide additional insight into Theme NGDA Dataset maturity levels including funding, obtaining data (acquisition), and quality control/quality assurance. By separating these questions from a particular stage, more information can be discerned about the NGDA Datasets within a Theme and help identify activities that are doing well or where some additional attention may be needed. For each of these maturity questions, if the "0/5" (No process exists) option was selected, additional detail was requested. Optional information could also be provided for the supplemental justification questions under the "Other" response option.

Funding

Question 1 in the LMA asks about a process to obtain funding for all lifecycle stages such as planning, development, maintenance, access, and archiving of an NGDA Dataset. The question also provides additional detail about primary and secondary funding sources.

Question 1		General Questions
Is there a recurring process to obtain funding for all lifecycle stages of this dataset?		
Maturity Level	**Number of Responses**	**Response Options**
5/5	7	Funding support is part of agency budget on a recurring basis, funding is consistent and tied to business requirements, and supports all lifecycle stages
4/5	0	Funding is currently adequate and consistent but tied to business requirements whose appropriations are not directed to support all lifecycle stages of the NGDA
3/5	1	Funding support exists but is not adequate to meet known requirements, most lifecycle stages are supported
2/5	0	Funding is planned at agency level, supporting staff is assigned, but funding is not recurring, some lifecycle stages are supported
1/5	0	Funding is from local offices, budgeting effort is minimal, staffing is minimal
0/5	1	No process to obtain funding exists (Please explain) • As of 2017, no more high-resolution aerial imagery is being added to the collection.

Table 4: NGDA Maturity Level Totals for Funding.

Question 1.a		General Questions
1.a) To justify your response to Question 1, what is the primary funding source for your NGDA?		
Number of Responses	**Response Options**	
1	**Directed appropriation(s)** – Funding signed into law by Congress for a specific program that supports this NGDA or the NGDA itself.	
7	**Federal agency** – General lead agency budgetary funding for a specific program that supports this NGDA or the NGDA itself.	

Table 5: Primary Funding Source for NGDA Datasets in Theme.

Question 1.b	General Questions
1.b) To justify your response to Question 1, what is the secondary funding source for your NGDA?	

Number of Responses	Response Options
1	**Federal interagency** – Agreements between one or more other Federal Department(s), Agency(ies), Bureau(s), and/or Office(s) to provide funding for a specific program that supports this NGDA or the NGDA itself.

Table 6: Secondary Funding Source for NGDA Datasets in Theme.

Obtaining Data

Question 10 in the LMA identifies whether a process exists for obtaining data related to the NGDA and if so, what actions are performed to obtain data. There may be multiple ways data is obtained for an NGDA Dataset.

Question 10		Stage 3 - Obtain
Is there a process for obtaining data for this dataset?		
Maturity Level	Number of Responses	Response Options
5/5	7	Fully implemented including recurring assessments
4/5	1	Implementation well established
3/5	0	Implementation progressing
2/5	0	Developed, documented, and implementation started
1/5	0	Under development
0/5	1	No process exists • As of 2017, no more high-resolution aerial imagery is being sought or added to the collection.

Table 7: NGDA Maturity Level Totals for Obtaining Data.

Question 10.a	Stage 3 - Obtain

10.a) To justify your response to Question 10, what actions are performed to obtain data?

Number of Responses	Response Options
1	Obtain data by purchasing
1	Obtain data by modifying, converting, or transforming data
1	Obtain data by sharing/exchanging
4	Obtain data by creating and/or collecting the data
6	Other – (Please explain) • Data Download (2 responses) • Specifications for the satellite and sensor are all documented. These specifications could be utilized to have the system rebuilt and launched. • The ASTER and MODIS datasets consist of the measurements from the ASTER and MODIS instruments on NASA's EOS spacecraft, as well as standard digital scientific products derived from those measurements. The data collection began in 1999 from the EOS Terra spacecraft which carries ASTER and one of two MODIS instruments, and in 2002 from the EOS Aqua spacecraft which carries the other MODIS instrument. Thus, the data collection process has been in place for more than a decade, and will continue as long as the instruments and spacecraft are functioning. Once every two years, NASA Headquarters conducts a Senior Review, a review by an external scientific committee, of all missions that have exceeded their original design life and uses the results of the review to decide whether to extend the collection of data or terminate the missions. (3 responses)

Table 8: Actions Performed to Obtain Data for NGDA Datasets in Theme.

Quality Assurance/Quality Control (QA/QC)

Question 15 in the LMA asks whether a process for quality assurance/quality control exists and the level of maturity of the process.

Question 15		Stage 5 - Maintain

Is there a quality assurance/quality control (QA/QC) process as part of this dataset's maintenance?

Maturity Level	Number of Responses	Response Options
5/5	7	Fully implemented including recurring assessments
4/5	2	Implementation well established
3/5	0	Implementation progressing
2/5	0	Developed, documented, and implementation started
1/5	0	Under development
0/5	0	No process exists

Table 9: NGDA Maturity Level Totals for Quality Assurance/Quality Control Process.

Imagery Theme Strategic Goals and Objectives Progress Report

Introduction and Background

Each NGDA Theme has a Theme Strategic Plan to guide Theme development and management. It is developed by the Federal agencies with Theme leadership roles. Each Theme Strategic Plan describes the goals and objectives for the Theme and generally spans 3 to 5 years. It is assessed annually as needed for significant changes. In 2016-2017, the FGDC Steering Committee identified the additional priority for each Theme to develop a Theme Implementation Plan that identifies the actions and activities necessary to achieve the Theme's goals and objectives. The NGDA Themes' Strategic and associated Implementation Plans are available in Adobe PDF format via the respective Geoplatform.gov NGDA Theme Community pages (see Resource Links below).

Resource Links

Theme Strategic Plan: Imagery Theme Strategic Plan

Theme Implementation Plan: In Progress

Progress in 2017

As noted above, Theme Strategic Plans identify goals and objectives for the Theme as they relate to Agency Strategic Plans. The Theme Implementation Plans further identify actions and activities that will be taken to support those goals and objectives. The Implementation Plans also include milestones, projected completion dates and performance indicators, and identify stakeholders and responsible parties. A summary of progress against the Theme Strategic Plan goals and objectives is provided as part of this overall Theme Summary Report. The following table shows the progress status made toward achieving the objectives during 2017. Status includes three categories: 'Not Started' for those activities that have not gotten underway; 'In Progress' for those activities underway which will continue into the next year; 'Complete' for the activities finished in this time frame. Additionally, if activities supporting the goal and objective are completed in the current year and will reoccur again on an annual basis, they are designated 'Recurring (completed for 2017)'.

Goals and Objectives undertaken during 2017	Status
Goal 1: Fulfill Agency Imagery Business Requirements.	
Objective 1.1. Identify Agency Requirements: Complete a comprehensive assessment of all Federal agency imagery requirements.	In Progress
Objective 1.2. Identify Mechanisms to Meet Agency Requirements and Build Effective Partnerships.	In Progress
Objective 1.3. Assess Imagery Requirements Fulfillment: Identify gaps in imagery requirements fulfillment, identify potential modifications to meet new needs, and apply "lessons learned" for program improvement.	In Progress
Objective 1.4. Funding: Create optimized funding model(s).	Not Started
Goal 2: Facilitate the Availability and Usage of Imagery and Geospatial Data.	
Objective 2.1. Support and Collaboration: Create an interagency support network for use by existing and potential imagery programs (including technical, managerial, coordination, and other activities).	In Progress
Objective 2.2. Data-Sharing: Identify Federal government options for licensed and unlicensed imagery and data distribution and access among agencies in an efficient and effective manner.	In Progress

Table 10: 2017 Progress Summary for Theme Strategic Plan Goals and Objectives.